# MODERN ASTRONOMY.

BY

THE REV. T. R. BIRKS, A.M.,

LATE FELLOW OF TRINITY COLLEGE, CAMBRIDGE.

LONDON:

THE RELIGIOUS TRACT SOCIETY;

*Instituted* 1799.

DEPOSITORY, 56, PATERNOSTER ROW, AND 65, ST. PAUL'S CHURCHYARD; AND SOLD BY THE BOOKSELLERS.

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AMONG all the sciences, Astronomy may claim the most intimate harmony, and the closest alliance, with religious truth. "Who can look up to the sky," says Cicero, "and not feel that there is a God?" "An undevout astronomer is mad," is the response of a modern poet to the words of the heathen philosopher. But we may claim higher witnesses of the same truth. "The heavens," we are taught by the inspired psalmist, "declare the glory of God; and the firmament showeth his handiwork." Their message overleaps the barriers of race, language, and climate, and speaks a lesson of holy reverence to the whole family of mankind. "There is no speech nor language, where their voice is not heard. Their line is gone out through all the earth, and their words to the end of the

world." God himself, by the lips of the prophet, invites his chosen people to study the wonders of the firmament, that they may deepen their confidence in his own power and goodness. "Lift up your eyes on high, and behold who hath created these things, that bringeth out their host by number: he calleth them all by names by the greatness of his might, for that he is strong in power; not one faileth. Why sayest thou, O Jacob, and speakest, O Israel, My way is hid from the Lord, and my judgment is passed over from my God?" And thus the contemplation of the heavens is a Divine remedy, prescribed by the voice of the almighty Creator to banish the doubts and fears of an unbelieving heart.

It might seem, then, a cheering omen for the interests of true religion, that, amidst all the wonderful achievements of modern science, the discoveries of astronomy occupy the foremost place. Her sister sciences can boast, indeed, of many trophies; but none of them will bear comparison with hers. In this eager race of intellectual competition, we may apply to her the words of Solomon,



"Many daughters have done virtuously, but thou excellest them all." Whether we consider the practical results, in those inventions which annihilate the barriers of the ocean, and establish the union and intercourse of the whole human race; or reflect on that amazing field of thought which has been opened to our contemplative faculties, and in which reason and imagination find their noblest exercise; we may well be astonished at the fertility and grandeur of those discoveries which adorn and ennoble the progress of astronomical science.

But in every part of the intellectual paradise, however tempting may be its stores of golden fruit, the tree of life and the tree of knowledge of good and evil stand side by side. The same discoveries, which awaken feelings of reverence and adoration in the heart of the true Christian, may only nurse the pride of a perverse and unbelieving spirit. Our growing knowledge of the works of the Most High becomes, with such men, an excuse for casting away the authority of his word. We are grown too wise, they fondly imagine, to sit any longer at the feet of Jewish peasants and

fishermen, though they may claim to be inspired messengers of God. Such persons look down with calm and indulgent contempt, from their fancied elevation, on the antiquated doctrines of the Bible. They replace the lessons of prophets and apostles by their own theories of physical development, and by their own more profound speculations and the grandeur and harmony of the material universe.

Such feelings, there is little doubt, are entertained by many, who have become familiar with the leading discoveries of modern science. By some they are painfully resisted, under a cold sense of duty; by others they are secretly cherished, under the double influence of intellectual pride, and a fear to shock the prejudices of their neighbours; by a few bold and reckless spirits they are ostentatiously avowed, with all the effrontery of a daring unbelief. A mere smattering of astronomy and geology suffices, in their fond conceit, to place them in the vanguard of human progress, emboldens them to extemporize the creation of a universe, and to look down with supercilious disdain on all simple and hearty faith in Divine revelation.



This evil was rife a whole generation ago; and the deep thought and fervid eloquence of the lamented Chalmers were then exerted to resist and expose it. His Astronomical Discourses form one of his noblest offerings on the altar of Christian truth. Yet the subject is by no means exhausted; and the moral evil they were designed to meet flourishes in as rank luxuriance as ever. There is room, then, for still further labours in this high field of inquiry. It is impossible, within a few pages, to comprise the wide range of thought which the subject would require for its complete elucidation. It will be endeavoured, at present, merely to point out the chief dangers which arise from the perversion of astronomical science, and to suggest those trains of thought which may supply a full antidote to the evil in its various forms. These deadly waters may thus, by the blessing of God, be deprived of their bitterness, and even be turned into living streams, like those of Lebanon, to refresh our spirits with a deeper and deeper insight into the ways and works of the Most High.

The discoveries and speculations of Modern

Astronomy present to us three different aspects—three successive stages, like Alpine peaks, each surpassing the other in grandeur and sublimity. They refer either to the extent of space through which the heavenly bodies are scattered, and the wide immensity of creation,—or to the laws which control and regulate their motions,—or to those presumptions or conjectures which we are led to form respecting the inhabitants of other worlds, and the vastness of the moral and intellectual universe. They may be termed Formal, Physical, and Cosmical Astronomy. Each has its own dangers, and needs a distinct antidote, that we may escape the subtle snares of unbelieving pride, and reap the spiritual benefit which these sublime discoveries are adapted to convey.

I. Let us begin with Formal Astronomy, or those successive discoveries of Hipparchus and Ptolemy, of Galileo, Bradley, and Herschel, of Bessel and Rosse, by which we are led to our actual conceptions of the immeasurable vastness of the starry universe.

The views of the ancients, on the order,



distances, and motions of the heavenly bodies, were, for a long time, confused and obscure. It was under Hipparchus, in the second century before Christ, that the science made its chief progress, and a near approach was made to an accurate description of the heavenly motions. The assumption that the earth was at rest introduced, it is true, a needless complexity. Relative was confounded with absolute motion; the ANNUAL revolution of the earth was transferred to the sun and planets, so as to complicate their movements; and the DIURNAL revolution, by the ideal introduction of an eighth sphere, was ascribed to the whole firmament. Yet this defect, in the eye of real science, was perhaps less than is commonly conceived. The time for the discovery of the physical laws of astronomy was not come, and the actual problem was how to explain most correctly the relative motions of the heavenly bodies, so as from their past to predict their future changes. The assumption that the sun is at rest, on which our popular explanations are founded, is itself a departure from the strictness of scientific truth. Such assumptions are necessary in

every stage of science; and modern analysis, while it prefers the hypothesis of Copernicus in the case of the planets, still finds the opposite assumption more convenient in the difficult researches of the lunar theory. In the eye of science, the sun and the earth are alike in constant motion; and the speed of the latter in its orbit is rivalled by the progress of the whole system through infinite space. In every case it is only the relative motions on which the apparent phenomena depend, and the system of Hipparchus and Ptolemy made a near approach to their practical determination. Copernicus at length simplified the outline of the system, and freed it from its main incumbrances, referring to the sun, as their centre, those cycles and epicycles, which were needful, by the laws of geometry, to account for the visible changes of the heavens. Soon afterwards Kepler discovered those three laws which bear his name. He thus not only confirmed the system of Copernicus, by proving the greatly increased simplicity of the planetary motions, when referred to the sun as their centre, but prepared the way for the birth of physical astronomy,



and the sublime discovery of universal gravitation. Meanwhile Galileo introduced the telescope, and soon detected the phases of Venus and the satellites of Jupiter. But it is the elder Herschel who has given the chief impulse to this branch of the science. In his hands, the telescope was carried to far greater perfection, and it led him to those sublime discoveries which oppress the imagination with their grandeur, in the view they unfold to us of the boundless immensity of the universe.

Instead of tracing the details in the order of their historical discovery, it seems better to point out the main steps in that ladder of science, which leads us to the most advanced conceptions of the architecture of the heavens.

The whole of astronomy, viewed as a science of motions and distances alone, depends on one simple truth of geometry—the relation between the angles and the sides of a triangle; so that, when one side and two angles are determined, all the others may be found. To scale the heavens by this sublime trigonometry, we must first ascertain the size of the earth on which we live. To know ourselves is

the first step towards the knowledge of God in these wonderful works of his hand. The necessary datum was obtained very nearly by the ancient astronomers; and the plain of Egypt from Alexandria to Syene, along the banks of the Nile, and by the foot of the mighty pyramids, was the first base line of the universe. The earth's circumference was then fixed at 250,000 stadia, or very nearly at its true length. But so long as the great ocean was sealed from the mariner, and the equator had never been crossed, much doubt still hung over their calculations. Columbus, using all the light which science could furnish in his days, erred nearly ten thousand miles in his estimate of the unknown part of the earth's circumference. His great enterprise, in which every calculation was a total error, though every instinct of hope was true and faithful, cleared away the dark cloud which hung over the great western ocean; and, while it gave a mighty impulse to every science, secured to all future ages an assured knowledge of the dimensions of the earth.

The relative distances of the planets from the sun had long been nearly fixed by Hip-



parchus and Ptolemy, and ever since Kepler's great discovery had been more fully and rigorously determined. But to ascertain the absolute dimensions of the new orbits was far more difficult. The parallax of the moon enabled astronomers to determine that her distance was about sixty semi-diameters of the earth; but to obtain the distance of the sun by this means was almost impracticable. The solar parallax is so small, that a very slight error in estimating it will falsify the result by many millions of miles. The transit of Venus is the phenomenon best suited for an exact determination. At conjunction, she is nearer to the earth than any other body except the moon, and she is moving in the same direction, and with a velocity not very different, so that the time of a transit must be considerable. When observed from one side of the earth it will be doubly shortened, and from the other side it will be doubly lengthened, by the effect of parallax, while a difference of latitude produces a similar change: so that the total difference may amount to several hours, and be measured with great accuracy. Tahiti was chosen as the best

station on the opposite side of the world. That little islet, since then visited and reclaimed by the missionaries of the gospel, was visited still earlier by the missionaries of science. On the shore of that lovely spot, and in the bosom of the mighty Pacific Ocean, the ladder of discovery was firmly planted, by which we can ascend to a true estimate of the magnitude of the solar system and of the starry universe.

What then was the result of this new advance in astronomy? The sun, whose light visits our eyelids every morning, is so remote, that if we could construct a celestial railway, and traverse it with the speed of our swiftest trains, more than two centuries would elapse, and six generations have passed away, before we could reach the limit of our journey. Still more vast are the dimensions of the planetary system. Saturn, the most remote of the planets known to the ancients, was proved to be nine hundred millions of miles distant from the sun, and when in conjunction a thousand millions from the earth. The immense journey over this interval would therefore occupy the whole time from the



flood of Noah to the birth of our Lord; and some centuries would still be needed, before the traveller could have returned to our earth again. The discovery, first of Uranus, and lately of Neptune, has still more enlarged the limits of our system. The last-named planet is one hundred and sixty-six years in its circuit, and nearly three thousand millions of miles distant. If we could travel thither with the utmost speed which modern science has lent to our journeys, nearly seven thousand years would expire before we could complete the immense voyage, or overtake that distant planet, where it moves slowly, like a sentinel in moonlight, on the outermost verge of our planetary universe.

Here, then, we have already reached a lofty elevation; but we are still only at the first main stage in the celestial journey. The orbit of the earth forms a new basis of observation, two thousand four hundred times larger than the earth's circumference, from which we may launch out further into infinite space. Here science planted the ladder once more, that she might scale the heavens, and explore the starry regions. For a long time,

however, even from this loftier point of observation, it was found impossible to determine the real magnitude of the heavens. The distance of the stars was so immense, that one hundred and ninety millions of miles, the extent of the earth's annual motion, made no seeming difference in their relative position. The utmost that could be done was to assign a limit, beyond which the nearest stars must be situated; and this limit, at a low estimate, might be reckoned at ten billions of miles. To traverse this enormous interval, at fifty miles an hour, would require twenty millions of years, or the whole period from the creation of Adam repeated three thousand times. Could we conceive a bridge spanning the gulf, like that which our great poet ascribes to the two infernal architects, and that all who have ever lived on our world were made sentinels along its dreary pathway, a distance of fifty miles would separate each from his fellow; while nearly all would be concealed in that outer darkness, where the light of the noonday sun is reduced to the twinkling of a little star.

Of late, however, some approach has been



made to a more exact decision. By the researches of Bessel, Henderson, and Peters, the parallax of three, possibly of seven or eight stars, appears to be nearly determined. The nearest, $\alpha$, Centauri, is proved to be about twenty-two billions of miles distant; the next, 61, Cygni, almost sixty billions; the bright star, $\alpha$, Lyræ, rather less than eighty; Sirius, rather less than ninety billions; while Arcturus, so far as reliance can be placed on the estimate of a parallax not exceeding the eighth of a second, would appear to be one hundred and sixty billions of miles distant from our system, and its light will require twenty-six years to reach the earth. And hence, if our speed were such that we could travel round the earth in a single hour, eight hundred thousand years must be spent before we could arrive at that wonderful luminary to which the Almighty appealed, in the world's infancy, as a proof of his unsearchable greatness: "Canst thou bring forth Mazzaroth in his season? or canst thou guide Arcturus with his sons?"

But here another field of thought, far more vast and wonderful, opens before us.

The Milky Way, tried by the keen eye of science, reveals to us that our sun, with its attendant planets, is only one of an immense number of stars disposed in a system of determinate outline, but of which the extent seems almost immeasurable. To use the words of sir J. Herschel: "This remarkable belt, when examined by powerful telescopes, is found to consist entirely of stars, scattered by millions like glittering dust on the black ground of the general heavens." The forty-feet telescope of sir W. Herschel, though it was supposed to reach into space five hundred times further than Sirius, could not pierce in some directions to the boundary of this immense system. With every increase of power, from the lowest to the highest, fresh tiers of stars were discovered. From a careful analysis, founded on a system of gauges, it appears that a power of one hundred and eighty reveals more than three millions of stars within fifteen degrees north and south from the great circle of the Milky Way And since in some parts the higher powers, up to one thousand, disclose fresh tiers of stars; it is hardly an excessive estimate, to



conjecture that the whole number of stars in the Galaxy may amount to twenty or thirty millions. What an overwhelming field of contemplation! Millions on millions of suns, many of them, like Sirius, far brighter than our own, are here disposed in one immense system, of which the length in several directions is more than seven hundred and fifty times the distance of Sirius, or sixty thousand billions of miles. The rays of light, though their own motion is inconceivably swift, would therefore occupy nearly ten thousand years in travelling from one extremity to the other of this enormous cluster, which overwhelms our thoughts in the vain effort to comprehend its real immensity.

The discoveries of science do not stop even here, but lead us to a still higher elevation, and to still more lofty views of the grandeur of the universe. Five thousand nebulæ have been observed, scattered throughout the firmament. Most of them, under the scrutiny of powerful telescopes, and especially in the noble instrument of lord Rosse, exhibit clear signs that they are systems of innumerable stars, immensely remote from each

other, and yet aggregated in distinct clusters, like those which are seen in the Galaxy, to which the sun itself belongs. The most advanced science can form only a rude estimate of their magnitude, and of the number of the stars in each system. Many of them, however, are probably not inferior to our own. The most remote are at least seven or eight thousand times more distant than the nearest stars; so that light would probably occupy fifty thousand years in travelling from them to our earth; and even this estimate, if we may judge from analogy, is still short of the true distance. For if the distance of these nebulous systems from each other, compared with their own magnitude, bears any resemblance to the distance which separates each planetary system from the nearest fixed stars, since the distance of the star in the Swan exceeds that of the new planet Neptune six thousand times, it is not unlikely that the intervals of many of the nebulæ are a thousand times greater than the utmost extent of the Milky Way, or not less than sixty trillions of miles. Such a remoteness is really inconceivable, since light



itself, in traversing it, would occupy almost ten million years, or more than fifteen hundred times the whole period from the creation of Adam down to our own day. Imagination fails in the attempt to realize these immense distances. Our spirit faints on the threshold of this glorious temple of the Divine Majesty, where thousands of systems, each containing millions of suns and their attendant planets, are sown broadcast through infinite space. In the presence of such truths we can only repeat the solemn confession of prophets and apostles: "Who is like unto thee, O Lord,—glorious in holiness, fearful in praises, doing wonders?" "Great and marvellous are thy works, Lord God Almighty!"

Now the very magnificence of these discoveries, and the view they disclose of the vastness of the universe, may become a snare to the unbelieving spirit of men. The words of the psalmist may then be repeated in a sense widely different from his own—"What is man, that thou art mindful of him? and the son of man, that thou visitest him?" We are creatures, it may thus be

inferred, too insignificant and minute to have any part in the care of the Almighty. Surely that Supreme Intelligence, which is occupied with all these innumerable worlds, can never stoop to the special oversight of our mean and petty existence!

Pride is never more dangerous than when it assumes the guise of voluntary humility. The effect is the same, whether we interpose hierarchies and orders of angels, or innumerable starry systems, between our own littleness and the majesty of the Most High. The link of faith is broken and severed. It seems possible, amidst the magnificence of so vast an empire, to set up unobserved an independent sovereignty in our little corner of the universe. With a deceitful show of reverence, the fallen heart celebrates the immensity of the creation, that it may escape from the consciousness of the Creator's presence; and dwells on the stupendous range of his universal providence, in the vain hope that its own rebellion may elude the vigilance of the all-seeing eye of God. Man, it will then be told us, is a mere ephemeron, soon to pass away, like the races of the buried



world beneath us, a drop on the mighty ocean of being,

"Who sinks into the depths with bubbling groan,
Without a grave, unknelled, uncoffined, and unknown."

One answer to this subtle delusion has already been given, with great force and beauty of thought, in the discourses to which allusion has been made. It is only the littleness of our minds, which leads us to fancy that the immensity of God's providence implies its imperfection, and that He who controls and regulates countless systems of starry worlds, is exhausted with the vastness of his dominion, and unable to bestow a minute and watchful care over every one of the creatures he has made.

But if science opens this new temptation, science well supplies the remedy. While the telescope has revealed the wonders of Providence in the vastness of creation, the microscope has detected wonders, hardly less impressive, in the wisdom lavished on every corner of our little world. There are no signs to be found that the Creator is exhausted with the immensity of his own

creation, and unable to fill every part of the universe with innumerable signs of his goodness and proofs of his immediate care.—Science, it is true, has put a deeper meaning into the words of the psalmist, wherein he celebrates the majesty of Divine Providence. "He telleth the number of the stars; he calleth them all by their names." But while the telescope has lent a wondrous commentary to these words, the microscope has interpreted not less wondrously the saying of our Lord, so full of comfort to the believing heart: "Are not two sparrows sold for a farthing? and one of them shall not fall on the ground without your Father: but the very hairs of your head are all numbered. Fear not therefore, ye are of more value than many sparrows." Yes, the depth as well as the height, the minuteness as well as the majesty, of God's universal providence are alike inscrutable; and the answer to the vain disguises, or false humility of unbelief, s found in the words addressed by the mouth of the prophet as a challenge to the whole human race: "Can any hide himself in secret places that I shall not see him? saith



the Lord. Do not I fill heaven and earth? saith the Lord."

But there is another answer which may be given to the dangerous temptation, which would persuade us that our insignificance must escape the notice of the Almighty Creator, because of the immeasurable extent of the material universe. We may reply, further, and with equal truth, that mind is far nobler than matter, and that one immortal spirit may surpass in dignity all the countless worlds which science has disclosed in the starry firmament.

Before we can institute this comparison aright, there is a fertile source of illusion which must be removed. The mind of man is creative and imaginative. It is not content to gaze on a naked landscape, either on earth or in heaven. No sooner are fresh regions opened to its view, than it invests them with human interests, peoples them with human sympathies, and fills them, at least in thought, with creatures whose powers and faculties bear some close resemblance to its own. If we search narrowly into the nature of those deep emotions which the

discoveries of astronomy awaken in our minds, we may trace them to three main sources:—our admiration for the faculties of thought by which those discoveries are made; our dim imaginings respecting the inhabitants of these countless worlds; and our impressions of the power, the wisdom, and goodness of the Almighty Creator, by whose word they rose into being. We do not contrast mind with matter, but the dull peasant with the far-seeing philosopher—one mind with minds innumerable; and, above all, the scanty and limited faculties of a feeble mortal with the unsearchable wisdom of the Uncreated and Supreme Intelligence.

To dispel this natural illusion, the comparison must be made differently. The two elements—mind and matter—must be kept separate in our thoughts, before their relative importance in the scale of being can be ascertained. Would you argue us into a denial of our true dignity by reasons drawn from the vastness of the firmament? Enlarge then, to the utmost, your conceptions of its grandeur; but see that no foreign element of human feeling and sympathy is suffered to



interfere, and falsify your judgment. Picture to yourself myriads of starry systems, each of them blazing with the splendour of millions of suns, and every sun either circled with its own various planets, or revolving in double and triple systems, and all these clusters of suns, sparkling with radiance, and sown in rich profusion through the wide regions of infinite space. Let your fancy clothe them with lovely verdure, or fill them with gems of varied brilliance, or diversify them with stately mountains and gloomy volcanic caverns; and let every variety of material splendour be added, to beautify and decorate the gorgeous landscape of these innumerable worlds. But conceive, also, that all these regions are without one living inhabitant, desolate and bare of all intelligence, a wide, unpeopled wilderness of matter, space, and motion; that no sound of human voice is heard throughout their immensity; that these orbs move on in silence, unblessed by one angel visitant; that no eye beholds their brightness; that no ear has caught the solemn music of their ever-moving spheres. In contrast with this immense loneliness,

this infinite range of desolation, let us contemplate Newton himself, placed solitary and alone on the surface of our little planet, when every fellow-mortal had passed away. The descent in outward grandeur is immense and unspeakable, from those countless myriads of worlds, each enormously vast and surpassingly brilliant, to one little speck of animated dust. But that dust, by God's mysterious power, is linked with an immortal spirit, which can outlive the spheres, and travel in thought beyond the limits of space up to the throne of God. That seeming insect, pinned down to earth by the laws of matter, is endued with reason, thought, and feeling: he is a spiritual being. He can gaze upon the earth beneath, and feel its beauty: he can look up to the starry firmament, and be filled with adoring wonder by the vision of its glories. He can borrow help from the dull lifeless matter around him, whereby to enlarge his own feeble senses, and pierce further and range wider into the depths of space. He can discover innumerable worlds, themselves without a single tenant, and people them with life, and



clothe them with unimaginable beauty, from the fountain of his own spirit-life within. He can detect the secret laws which control them amidst all the complexity of their motions, can predict their course for ages to come, trace the influence of each atom on its brother atom, and of planet on its sister planet, and rove from star to star on the wings of thought, deciphering everywhere the secret characters of Divine wisdom. He can thus resolve the chaos of ever-shifting phenomena into the unity of one simple law, whose source is the will of the Most High, and whose voice is the harmony of innumerable worlds; and present the whole as an offering to the glory of the Divine Architect, in devout ascriptions of thanksgiving and praise. Who can contrast the wide universe of unthinking, lifeless matter, however immeasurable its vastness, or however diversified its forms, with one such intelligence, that has power to read the enigma of that universe, and rise to the footstool of the ever-living and almighty Creator, and not feel that the material creation itself has no glory in this respect, by reason of the glory of mind, which far excelleth its own,

Neither blazing suns nor their circling planets, nor misty nebulæ—though their number be reckoned by billions, and their distances measured by trillions upon trillions of miles—will bear comparison with the dignity of an immortal spirit, which can reason on the works and ways of God, and pour out its love and adoration with a seraph's ardour at the footstool of the Most High.

II. But here another branch of the same inquiry opens before us. It was the mind of Newton which gave birth to the new science of Physical Astronomy, when it pierced below the surface of the celestial phenomena, and detected the secret law of universal gravitation. There is a solemn and entrancing interest in the contemplation of those stars and starry systems which modern discoveries have revealed, even if no order could be traced in their immense intervals and varied motions, and we were merely to lose ourselves, as in a Cretan labyrinth, in the sublime chance-medley of the universe. But now, by virtue of this new science, a mysterious unity beams out upon us from every part of the creation.



The sublime disorder of the firmament is replaced by an order, still more deeply and wonderfully sublime. We seem admitted to the secret council-chamber of the Great Architect. One simple law of force, like the thread of Ariadne, guides our steps with unfailing certainty amidst changes so complex, motions so intricate and involved, phenomena so countless and diverse, that we might well have despaired of being able ever to penetrate beneath the veil which conceals their hidden causes. This one discovery, hitherto, has no rival amidst all the splendid triumphs of modern science. The falling apple, in the thoughtful mind of our great philosopher, has been a ladder wherewith to scale the heavens, and a key to unlock one half of the noblest wonders of the natural universe; and we have not, even now, reached the limits of this great discovery. With a more exact and profound analysis, it may probably yield hereafter as rich a harvest to science amidst the microscopic and minuter wonders of nature, as it has already yielded in those loftier regions which the telescope has explored. The words of the queen of the south to

Solomon may be fully applied to this all-pervading law. Science has not hitherto told us one half of its treasures of secret wisdom. But this we know already, that every atom of our system, even the most minute, acts with measurable force on every other;—that the uplifted arm of the little child has power to affect the motions of every planet;—that the moon, in her silent course, is influenced by every buried gem in the deep places of the earth, and influences them in return;—that every mountain and valley, every drop in the ocean, and every leaf in the forest, conspire to determine the law of the celestial motions;—that one simple law explains the swiftness of every planet, whether real or apparent, in every variety of aspect, the shape of its orbit, and the orbit of every satellite, the complicated cycles of the moon, the precession of the equinoxes, the tides of the ocean, the wandering pathway of every comet, the figure of the earth, the libration of the moon's surface, with every slighter irregularity of the planetary motions, and the seeming tremulous vibrations of the whole starry firmament. Of late, in the discovery of Neptune, we have



witnessed one of its most remarkable triumphs. By its action on another planet—itself so recently discovered, that it has not yet completed one whole circuit, and one thousand eight hundred millions of miles distant from us—a planet still more distant has been detected, which completes only six revolutions in a thousand years, and in each revolution describes the immense circuit of near twenty thousand millions of miles. There it had remained, in the dim twilight of our system, for six thousand years, unseen by the eye of man, till science detected its presence by its disturbing influence on the nearest planet, across an interval of twelve hundred millions of miles, and taught the observer where to direct his telescope, that he might add another planet to our system, and make another inroad on the immense void of outer darkness.

But the truths of Physical Astronomy have their own peculiar danger to speculative minds. Pride and unbelief can turn even the manna of heaven into deadly poison. Atheistical astronomers have boasted that their discoveries would banish final causes from the universe; while, of late, speculations have

been revived, which annul the very idea of Creation and Providence, and set up the hideous spectre of a blind fatality on the throne of the true and living God. The language, which Milton ascribes to the rebel angels, is transferred in these systems to the physical laws of nature, and is then propounded as the highest point of true philosophy.

> "We know no time when we were not as now;
> Know none before us, self-begot, self-raised,
> By our own quickening power, when fatal force
> Had circled its full orb, the birth mature
> Of this our native heaven, ethereal sons:
> Our puissance is our own."

Chaos, in the heathen fables, was called the eldest of the gods, and the doctrine has been revived under the garb of science. This chaos develops itself into suns and planets; the atom into the insect, the insect into the fish, the fish into the monkey, and the monkey,

> "Self-raised by his own quickening power,"

develops into man. Man himself, by the same process, will develop into some higher race,



when the former will pass away, and melt like foam into the abyss of universal being.

This blind worship of natural laws, the result of perverted science, strikes at the very root of all natural and revealed religion. The very idea of creation, as the sovereign act of a personal and living God, is destroyed; and all faith in Providence must also perish. Man becomes the slave of inexorable laws, from which there is no escape, and which hurry him with blind and irresistible force from the cradle to the grave, where he expires for ever. God is dethroned, and a formula of forces and distances — the most wretched of idols—is set up in his stead. Prayer becomes useless, and praise ridiculous; for who can reverse the laws of fate, or who would celebrate the goodness of an algebraic theorem? A dreary tyranny of blind force, issuing it knows not whence, working it knows not how or why, travelling onward perpetually it knows not whither, crushing under its chariot-wheels all the myriad creatures whom it has mocked with a passing semblance of individual being—such is the spectre that scowls darkly upon us, and

would blot out from our faith the blessed and only Potentate, the true Fountain of life, love, and joy, to the universe he has made.

A clear view of the real evidence by which the fact of creation is revealed to us, will form one main antidote to these delusive theories. The mole, however skilful in burrowing in the earth, has no eyes to behold the brightness of the sun. The length of its galleries brings it no nearer to the light; and should that light ever burst upon it, the only effect is to drive it underground, to prolong its dark excavations still further. So it is in this high field of thought. An induction which merely travels underground, along the series of physical changes, will never detect the signs of a Creator's presence. That evidence, so abundant to the thoughtful spirit, must be sought in a higher region of its own. It is not the mere observation of shifting effects, but the contemplation of necessary causes, which leads our thoughts to the footstool of the Almighty. "Through faith we understand that the worlds were framed by the word of God," Heb. xi. 3.

Let us conceive that a multitude of atoms



were suddenly created, definite in their numbers, their position, force, and velocity, and submitted to the law of universal gravitation. Science, if it were perfect, would then enable us to predict their future changes, and their exact place and motions at any later period. But the same process would enable us to trace the results of the law, backward as well as forward, and to exhibit their place and motion, as it would have been thousands of years before, if their creation were so distant, and the same law had already been in operation. Now the analysis which merely develops the results, if the atoms and the forces are supposed to exist, and which extends with equal readiness to a past as to a future eternity, can lend us no chronology for events beyond its own range, namely, the creation of the atoms, and the institution of the law by which their motions are now governed. The certainty of the fact itself we gain from a direct meditation on the clear possibility of a different law, and the dependent nature of all material being; but the time when it occurred must be learned, if learned at all, by direct revelation. Reason proves that a

creation is necessary, and proves also that its date can never be fixed by science alone. When we have gone back to the first origin of living creatures, all beyond is hypothesis without the possibility of evidence. Creation, whenever it occurred, would be like a mirror, bounding some spacious corridor. The future would, by the very nature of physical laws, reproduce itself in a visionary past, equally interminable to the eye; a series of changes which might have been, though they were not; and which cheat the senses with a false impression of their own reality. It is faith alone which can raise us out of this desert of unreal possibilities into the vision of the almighty Architect, who "spake, and it was done;" who "commanded, and it stood fast." Those who will not see his hand in the present, will never find it by transporting the same unbelief into past ages. They will only lose themselves in a dreary wilderness of changes, without causes to explain them, or evidence to prove their occurrence, and which leave the problem exactly where they found it, "a land of darkness, and of the shadow of death,—and where the light is as darkness."



A further antidote to these infidel speculations may be found in a more comprehensive view of Physical Astronomy. The law of gravitation alone, however simple and all-pervading, would never explain one single fact, without the introduction of other elements. These, in mathematics, are called arbitrary constants; and, in astronomy, are represented by the elements of each planetary orbit. Their number is seven times as great as the number of bodies themselves, though this may be slightly diminished, when we merely estimate the relative motions. And these data, on which the whole character of the system depends, are entirely arbitrary in the view of science. We learn them from careful observation, but could never obtain them by the profoundest reasoning. Science merely proves that, whatever they are, they might have been quite different. And this is equally true, whatever epoch we assume for the comparison. Let us suppose that, by the law of gravitation, a nebulous ether might gradually congregate into systems, and suns, and planetary worlds. Still, it is equally certain that every atom in that

ether would require the exercise of sovereign wisdom to fix its place and motion, in order to produce the present system of the heavens; as if the planets had been created at once, and launched by the immediate hand of God in their actual orbits. In either case, blind fate, and the mere law of force, are equally incapable of securing the varied beauty and grandeur that we see around us, or which science discloses throughout the starry heavens.

In the revealed character of God two opposite perfections meet and are harmonized together—the highest necessity, and the most perfect liberty. He is at once the Supreme Reason and the Sovereign Will. In the false systems of perverted science, reason is degraded into blind fate, and the sovereignty of the Divine Will is entirely set aside. And thus, instead of the living God, we have only a mysterious necessity—a soul of the universe, that can awaken neither hope, nor love, nor reverence. The name of science has been invoked, to countenance this impious delusion. But science only proves its utter fallacy. All the mighty revolutions of the heavens, it tells



us, can only be explained by the union of two contrasted elements: namely, a law of simple and all-pervading energy; and special conditions of place, force, and motion, which will not resolve themselves into that primary law, and can find their origin only in the free choice of some intelligent will. The law represents to us the supremacy of Infinite Reason; the special circumstances, under which it acts, reveal to us the sovereignty of the Creative Intelligence. When we can have force without matter, and matter without place; or when we can construct an ellipse without axes and dimensions; then only may we attempt to solve even physical phenomena without recourse to the sovereign and absolute will of the Lord God, the Maker of heaven and earth, and all things therein.

But we cannot suppose that one law, however comprehensive, exhausts the mysteries of the material universe. The whole recent course of science points to an opposite conclusion, and tells us that we are still only on the shore of a mighty ocean, and that nature has secret powers and many various influences, which our discoveries have scarcely begun to

reveal. Life is something higher and nobler than a mere power of attraction and repulsion; and, even in its lower forms, there seems to be involved some kind of spontaneous activity. Even force alone can never be explained without reference to an act of creative power. But life, in all its forms and varieties, is still more inexplicable, until we raise our thoughts to the living God. He, and he alone, could clothe the barren wastes of the material universe with their garment of beauty. He alone could give breath to the dwellers of the earth, and spirit to them that walk therein. He alone could endue the soul with those high powers, which enable us to decipher the wonders of nature, to explore her most hidden laws, and to range in thought beyond the limits of the universe, amidst the splendour of uncreated beauty, and the glorious archetypes of all earthly things.

The last and most complete answer to those dreams of fatality, to which a perverted view of scientific discovery has given birth, is to be found in a deeper meditation on that very law which exerts so wide an empire in the material creation. It is because the law of attraction has explained so much, that men have been tempted to imagine it could explain every thing, and have ventured on atheistic theories of the universe. And yet that very law, if we question it closely, will bear witness to higher truths, and lead our thoughts onward to the nobler discoveries of the Christian revelation.



All matter, however dull and lifeless it may appear, obeys one universal law, and is endowed with a ceaseless activity. That law is simple in itself, but unspeakably various in its results, and sublime from its very comprehensiveness. It controls the mote in the sunbeam, and the stars that range through infinite space. It regulates the heaving of the billow, and every wave that sparkles in the moonlight; while it rolls the planets in their courses, guides the comets in their devious wanderings, and determines the orbits of innumerable worlds. There is not a stone, buried in the earth, which is not affecting the motion of every star that glistens in the firmament. There is not a star, however remote, which does not send forth a measurable force to determine the tides of the ocean, and modulate

the motion of the lightest zephyr that plays over the landscapes of the spring. Not even a sparrow, our Lord has told us, can fall to the ground without our Father. And no wonder that this should be true;—for science tells us that the weight of that falling sparrow depends upon the action of every sea and every continent—every stratum down to the lowest centre—every particle of matter spread over all the surface of our globe; and that only the Omniscience which searches out all the deep places of the earth, could enable it, in its fall, to satisfy those sublime conditions which the God of nature has imposed, and which link it, in its descent, with every other part of the terrestrial universe. And can we conceive, amidst the brightness of such discoveries, that Mind has not its own laws, equally simple and comprehensive, but higher in dignity, as the impulses of love are nobler than those of physical pressure, and the sense of duty more exalted and sublime than a mere balance of centrifugal and centripetal forces? Yes, there must clearly be a law of moral obligation, supreme over all created things, and of which the law of universal attraction is only the type



and outward shadow. Duty is no arbitrary or conventional thing; it is a primitive and eternal law, whose seat is the bosom of God, and whose voice is the harmony of the whole universe. When science discovered the sublime truth, that every particle of matter attracts every other with a force varying with the distance, she merely caught the reflection, in the world of matter, of that higher law of duty which extends its sway throughout the whole spiritual universe. "Hear, O Israel, the Lord thy God is one Lord. And thou shalt love the Lord thy God with all thy heart, and with all thy mind, and with all thy strength: this is the first and great commandment. And the second is like it, Thou shalt love thy neighbour as thyself." Here also is a law, which links every created spirit with every other, and that by a bond of love depending on their mutual nearness, and the more intense, the more intimate their union;—a law which admits no exception, allows no compromise of its claim; which began to operate from the first hour of their being, and will continue its unbending force through the ages of eternity;—a law which, when obeyed,

guides worlds into harmony, and reduces seeming disturbance into order and deeper union; which includes all varieties of spiritual existence, from the new-born infant, that has just awakened to the consciousness of a will, to the seraph that worships before the throne;—nay, a law which extends its range still higher, since the Lawgiver himself has stooped to be subject to its authority, and it has been magnified and made honourable by the perfect obedience of the Son of God.

There is, indeed, one grand contrast between the law which science discovers, and that higher law of universal love, which conscience ratifies, but which the word of God alone distinctly reveals. Matter has no power of choice, and the law prescribed for its guidance is implicitly obeyed. But the will may break loose from the law which ought to govern it, and disorder and ruin enter into the moral universe. Reason pronounces the divergence to be possible, but experience proclaims it to be a certain and awful truth. Here the analogies of science, however beautiful and sublime, begin to fail us. They point us, indeed, to that Divine and perfect



law, which, if universally obeyed, would spread a harmony deeper than appears in the starry systems, throughout all the ranks and orders of created intelligence. But they reveal no remedy for moral evil. They lend us no key to the mystery, how the fallen will may be recovered; how the gulf between what is and what ought to be—between ideal love and actual selfishness and sin—may be bridged over; and creatures estranged from God and holiness, at discord with themselves and their fellows, may be restored again into the blessed circle of an all-embracing love. The gospel alone solves the mystery. Beyond all the laws of science, however glorious and sublime; beyond that perfect law of duty, binding all created intelligence, of which material laws are the reflection and shadow; is the great mystery of godliness, that "God was manifest in the flesh," and that faithful saying, worthy to be placed on high above all the lessons of natural and the precepts of ethical science, that "Christ Jesus came into the world to save sinners."

III. Here we are led onward to a still

higher field of thought. Cosmical Astronomy, though at present it offers little more than loose conjectures and misty speculations, has also dangers of no ordinary kind. The discoveries which science has made of the true distance of the stars, their countless numbers, the systems in which they are disposed, and the true place of our earth as one planet, out of many, attendant on one sun out of millions upon millions, could not fail to awaken many thoughts, and elicit many bold conjectures, respecting the extent and variety of the moral universe. Who can imagine that this little planet is the only scene of reason and intelligence throughout the wide range of these innumerable worlds? How natural to conceive that the races of created intelligences, endowed with reason, and capable of worship and obedience, are as numerous as the worlds which seem to be prepared for their habitation! Hence, alike by the earnest advocates of the faith, and by its adversaries, the idea seems to have been admitted as beyond dispute, that many other races, distinct entirely from mankind, inhabit those starry systems, and that the hosannas of a devout worship are



rising daily to the presence of the Almighty, from all the myriads of suns and starry systems, which are scattered far and wide through the depths of space.

Now, here, in this very admission, a serious difficulty may be started, to throw discredit on the great facts and doctrines of the Christian revelation. Is it not strange, it may be asked, that the Bible, which professes to be the word of God, is utterly silent with regard to those many races, probably in some respects resembling our own, which people these distant worlds? Is it not strange that it passes by in silence this immense range of Divine Providence, and confines itself simply and entirely to the works of God on this little planet alone? Nay, further, if indeed our race is only one amidst a countless multitude, equally the objects of Divine care, and worthy objects for the interference of Divine love, how can we believe a fact so unique in its very nature, as is implied in the doctrine of the incarnation? How can we suppose that the Creator of all worlds has linked himself, by an act of marvellous and peculiar love, with one only out of these many races, which might

be expected to share equally in the proofs of His ceaseless care, and the gifts of his universal benevolence?

Viewed in this light, it cannot be denied that the course of modern discovery does seem to present a serious impediment in the way of entire submission to the great message of the gospel. It is true, that if we were at liberty to remodel our faith, and pare it down to the cold level of ancient and modern heresy, the difficulty would be removed. We can easily conceive that the Most High might commission, in each separate world he has made, some holy messenger, honourable in his own race, to convey the messages of Divine love to his brethren. We can conceive, just as easily, that such a messenger would be attended with credentials to prove his mission, and be the bearer of a pure morality to the world or planet in which he appeared. But if we believe the Divine message, that Jesus is the Son of God, the Word by whom all things were made, the only begotten of the Father, and the "brightness of his glory," by whom all things were created, whether visible or invisible, thrones, dominions, principalities, and powers; how can we reconcile it with our larger views of the universe, that such a prodigy of love and condescension as can never be equalled or repeated, should thus be lavished on one little planet alone?



Two replies have been offered to this difficulty; but however eloquently they have been unfolded, they will not fully satisfy the thoughtful mind. It may be conjectured that ours is the only world where sin has entered, and that the parable of the lost sheep applies, in its deepest meaning, to the contrast between our little world, and those countless regions, which are still peopled by races that have never fallen, and need no special interference of redeeming love. But this is to solve one difficulty by introducing another no less formidable. The Bible reveals to us two races alone —angels and men; and in each of these it further reveals the solemn fact of an apostasy from God and the entrance of moral evil. To suppose, therefore, myriads of races endued with reason, and like ourselves combining a bodily with a spiritual existence, but exempt from all the inroads of sin, and unvisited by that mighty and mysterious power

which has dragged down angels from their first glory, and involved all mankind in the miseries of the fall, is to violate the plainest lessons of moral probability, and to cross the analogy of everything which experience teaches, or which the word of God has revealed.

Again, it may be urged that the vastness of eternity, compared with the special season of the work of redemption upon earth, removes the seeming disproportion, and renders it possible that a series of revelations, equally glorious, may be given successively to other races, the inhabitants of other worlds. The course of human redemption may thus be paralleled to some deed of domestic tenderness, which throws a glory round a passing hour in the history of some mighty monarch, while years of life are employed in revealing, on a larger scale, the majesty of the sovereign, and his impartial care over all the provinces of a spacious empire. But this parallel, however ingenious, does not really apply. The incarnation is not an occurrence, which can be viewed as transitory and ephemeral. It is a fact which bears the plainest impress of



eternity; and cannot be compared with such passing exhibitions of royal kindness and condescension, until it has been stripped of its essential glory, by substituting a false and heretical counterfeit for the true doctrine, revealed in the word of God. Christ our Lord, as we believe on the warrant of Scripture, is the Son of God and the Son of man, in two distinct natures and one person, for ever. No desire to reconcile the truths of revelation with the real or supposed discoveries of science, should prevail with us to obscure this mystery of godliness, and resolve it into a transitory exhibition of Divine love, which, after a few years, will terminate and pass away.

How then shall the difficulty be removed? How can we reconcile the presumptions respecting other worlds, which flow from the discoveries of science, with the great doctrines of the Christian revelation? Let us enter for a few moments, with humility and reverence, on this great inquiry. The works of God must ever prove to be in entire harmony with his word; but to trace the harmony may not always be possible, for how

small a part do we now understand of the ways of the Most High! Yet even those imperfect glimpses we can gain of the unity and wisdom of all his counsels, will repay our most attentive and profound meditation.

Now, first, we do well to remember that the hypothesis, which assigns planets to every star, and peoples these stars and planets with distinct races of intelligent beings, however plausible and fascinating, however it may interest us by its novelty, or awaken us by its grandeur, is entirely wanting in all direct evidence of its truth. It is a conjecture, and nothing more. We have held no intercourse with these far distant regions, and the telescope has detected no trace of their inhabitants; the busy hum of their population has never reached our ears. We have no assurance from the lips of science, that they are the actual abode of living creatures, whose faculties and constitution resemble our own. Our conjectures respecting these distant worlds, if they are to have any sure foundation, must rest on the character of God, as the moral Governor of the universe; and we can learn that character only



from the revelation in his word. And thus, the very first step in our inquiry throws us back upon the Scriptures of truth, as the only source from which we can derive any real light on the moral history of regions so far beyond the range of human experience. The moon alone, of all the heavenly bodies, is so near to us as to render it possible that we might discern traces of living inhabitants. In this case, however, the whole tendency of recent discovery has been to disprove their existence. Its surface has been narrowly explored; but while it presents lofty mountains, and stupendous caverns, and all the tokens of volcanic agency in its most terrific form, no signs have hitherto been discerned of habitations, or of verdure like that which clothes the plains of our earth. "Those argent fields," when seen in powerful telescopes, lose their bright colouring, and exhibit little else than a dreary waste. They seem to be no fit home for translated saints, or middle spirits,

"Betwixt the angelical and human kind;"

but an unpeopled wilderness of matter, of which the true purpose is to exercise the

science of the philosopher, and kindle the fancy of the poet, "to be for signs and for seasons," and "to rule over the night" for the countless inhabitants of the earth.

Let us suppose, however—what remains uncertain in the present state of our knowledge—that other suns or planets are already fitted for human habitation, or for the dwelling of other races, differing slightly from our own. Still the lessons of Scripture, and the discoveries of science, alike forbid us to conclude, without further evidence, that they are actually the abode of some unknown race of intelligent beings.

The moral presumption, on which this inference is made to depend, is the certain truth—that God has made nothing in vain, and that every part of his works must fulfil some purpose worthy of the majesty of the Creator. Some tribute of praise to the most high God must ascend from every star that shines in the firmament. But it is one thing to be the habitation of intelligent creatures; and another, to be the object of their delighted contemplation, and a fertile theme for their devout admiration of the Almighty,



The reasoning which assigns its planets to every starry system, and peoples them with some unknown race, would be more conclusive, if there had been revealed to us no spiritual intelligences, unfettered by those laws, which bind us down, like insects, to the surface of our globe. But the view which Scripture unfolds is widely different.

> "Millions of spiritual creatures walk the earth
> Unseen, both when we wake and when we sleep:
> All these with ceaseless praise His works behold,
> Both day and night."

And though we cannot now hear "celestial voices from the steep of echoing hill or thicket," as in the days of Eden, we know that their number is ten thousand times ten thousand, and thousands of thousands, and that they can fly, if so permitted, with the speed of thought from system to system (Dan. ix. 21) through all the worlds which science reveals. Such glorious beings need not to be fettered with the bonds of mortality, in order to enjoy the magnificent spectacle of those innumerable suns which light up the midnight firmament, or to ex-

plore the mysteries of every planet, or to contemplate, with adoring praise, all the countless wonders of God throughout the natural universe.

But there are other discoveries of science, which equally suggest the need of caution and suspense, before we rush to the conclusion, that the stars and planets are now inhabited by rational creatures, because of their outward resemblance to the earth on which we live. For if we accept the views which modern discovery seems to establish, and which are almost universal among men of science, an interval of long ages intervened between the first existence of our planet and the origin of the human race. Man, we are told by the geologist, is but a recent occupant of our world. Before the mighty work of those six days which closed with the creation of Adam and Eve, a cycle of many changes had occurred, which some would estimate by thousands, and others by millions of years. On this view, the time during which our planet has been peopled with intelligent creatures is far less than the interval when it was still uninhabited, or occupied by creatures far



lower in the scale of being.* How, then, shall we dare to antedate a revelation which God has not given, or to assert that those countless worlds are created in vain; unless it has pleased the Almighty already to plant a separate race, and a distinct colony of worshippers, in every corner of the vast universe he has made? Perhaps the Creator, were he to reveal to us his own mind, would answer us, as the Redeemer himself made answer to the blessed virgin, too impatient to behold his miracles of mercy—"Woman, what have I to do with thee? mine hour is not yet come." "Children of the dust," he might say to us, "what have I to do with your impatient fancies? My hour to people these worlds of light with myriad worshippers is not yet come. Your planet, little though it be amidst the innumerable hosts that crowd its firmament, is the Bethlehem where I now choose to

* Since this little work was written, I find that Mr. Hugh Miller, in his "First Impressions of England," has made use of a similar train of reasoning on the discoveries of that science, in which he has earned so distinguished a name, and developed it briefly with his usual vigour and ability of thought and style.

reveal the mystery of my love to sinners, the guilty and the despised Nazareth of the wide universe, from which streams of light and heavenly wisdom shall go forth to gladden the countless worlds I have made. These waste and desolate places shall then be too narrow by reason of the inhabitants. But, first of all, the moral conflict must be waged, the powers of darkness be overthrown, the serpent adversary be trodden under foot by the mightier power of redeeming mercy, and death be swallowed up in the perfect victory of Divine love. Then it will be time to enlarge the tents that over-canopy my worshippers, and to stretch far and wide the curtains of their habitations through those innumerable worlds."

It is perhaps unnecessary to dwell more largely on this alternative, which equally meets the presumptions of science, and falls in with all the dim glimpses that revelation has offered concerning the unutterable glories of the world to come. On a subject so mysterious and sublime, it becomes not our ignorance to assume the tone of certain and assured knowledge. Yet surely, as a conjecture, the view thus opened is as glorious and sublime as the most ingenious speculations on unknown races of stellar inhabitants. It may be that, as the silence of Scripture seems almost to imply, angels and men are the only two classes of intelligent creatures—spirits unembodied, who can range freely over the wide universe and contemplate all its glories, and spirits that dwell in tabernacles of clay, who are tied down to one little planet, and can only catch a distant glimpse of the starry worlds. It may be, that hereafter, when the work of redemption is complete, a celestial emigration may begin from our little planet, and be carried on through countless generations in the world to come. It may be, that as fresh planets are prepared, by the slow processes of natural law, to receive a race of inhabitants, unborn patriarchs may be sent forth, like Noah, to people its desolate heritages, and be transported by the ministry of angels across the mighty void. It may be, that all those worlds, of which the distant light hardly reaches us after thousands of years, are waiting in the mysterious patience

of the Divine counsels, until they shall receive celestial rulers and terrestrial habitants from this obscure, and to them unknown spot, where alone the conflict with evil has been waged and the victory at length completely won. It may be—but of such bright hopes and dim conjectures there is no end. It is enough for us to rest upon that glorious promise, surer than the law which guides the planets in their courses. "He that spared not his own Son, but delivered him up for us all, how shall he not with him also freely give us all things?" It is enough that the Son of man, who once tabernacled among us in mortal flesh, is now at the right hand of the throne of God, and that when he returns to visit us once more, "of the increase of his government and peace there shall be no end." And if there be no limit to the increase of that dominion, who shall exclude the starry worlds from the range of redeemed humanity? Who shall place a bound, which the word of God has nowhere assigned, to the generations of that age of ages in the world to come?

Here, then, we may well close our brief



survey, and pause in adoring wonder on the brink of possibilities so vast and sublime. Perhaps, if one of those heavenly spirits, who now delight in viewing these mighty works of God, with a vision far clearer than our telescopes can ever supply, were to give us his counsel, he might warn us, in the words our great poet has ascribed to Raphael, against a premature attempt to fathom the deep things of the Almighty:

> "But whether thus these things, or whether not—
> Solicit not thy thoughts with matters hid;
> Leave them to God above; him serve and fear!
> Of other creatures, as him pleases best,
> Wherever placed, let him dispose; joy thou
> In what he gives to thee. Heaven is too high
> To know what passes there. Be lowly wise.
> Dream not of other worlds, what creatures there
> Live, in what state, condition, or degree;
> Contented that thus far hath been revealed,
> Not of earth only, but of highest heaven."

Or if the discoveries of science, and the approach of the great realities of the kingdom of glory, invite us to higher and wider contemplations, at least let us be careful that all our speculations on the ways and works of

God be drawn from his own messages, the only true source of insight into his counsels. Let us learn, amidst our dim guesses at such high and wonderful things, to repeat the ascription of him who was caught up in spirit, beyond the starry firmament, into the third heaven of glory: "Oh the depth of the riches both of the wisdom and knowledge of God! how unsearchable are his judgments, and his ways past finding out!"

But suspense of judgment on the hidden wonders of the natural universe, which lie beyond the range of our present vision, with adoring contemplation of the greatness and wisdom of God, and the possible extension of the kingdom of Christ in the ages to come, are not the sole lessons to be drawn from this interesting field of meditation. There is another and simpler lesson, which lies at our feet, and one which is unspeakable in its practical importance. He, in whom all these treasures of wisdom and knowledge are hidden, to whom the glories of every system, and the purpose of every star, are as familiar as our own fireside homes to each of ourselves, has revealed his will to mankind. Out of all his



stores of infinite knowledge, he has communicated to us those things which he sees it most vital to our everlasting welfare that every one of us should know. The choicest, the highest wisdom has been made accessible, like the air and the light of heaven, to the humblest and the poorest of mankind. When he uttered his voice, it was not to disclose some pathway to the stars, which the vulture's eye had never seen; but a far different message, of greater worth and more vital moment. "And unto man he said, Behold, the fear of the Lord, that is wisdom; and to depart from evil is understanding." When the only begotten Son of God, by whom all things were made, opened his mouth to instruct the waiting multitudes, it was not to reveal the law of gravitation, or the structure of the Milky Way, to expound the parallax of Sirius, or the nebula of Orion, but a message of peace and comfort to the weary and burdened heart: "Blessed are the poor in spirit; for theirs is the kingdom of heaven." When he announces that all things are delivered to him, it is not to dilate on the multitude of the starry worlds; but to utter the gracious and sublime

invitation, "Come unto me, all ye that labour and are heavy laden, and I will give you rest." And when, ascending to resume the throne of universal dominion, he proclaims, "All power is given unto me in heaven and in earth," the wonderful announcement is not the preface to a solution of all the doubts of science, but to the full proclamation of his atoning love to the sinners of mankind. "Go ye therefore, and teach all nations, baptizing them in the name of the Father, and of the Son, and of the Holy Ghost." There are countless works of God, excellent and glorious in themselves, which come within the range of that sentence: "What I do thou knowest not now, but thou shalt know hereafter." But there is one work, of immediate and vital importance—that every sinner of mankind should both feel and know, that "God was in Christ, reconciling the world to himself, and hath committed" to his messengers "the word of reconciliation." Beyond all the present or future discoveries of science, there is one great command which appeals to the heart and conscience of every immortal being, conscious of past sin and certain of a coming judgment—a



voice sweeter to the awakened conscience than the music of the spheres—which says in tones of mingled authority and tenderness, "Be ye reconciled to God." And if we could explore the secrets of every star, and return, like the bees, laden with all their sweetest treasures, to our little world, we could find no truth so vital and momentous to proclaim to our fellow-men, as that which sounds every day in the ears of careless multitudes in the volume of inspired truth, "Behold, now is the accepted time; behold, now is the day of salvation." "The redemption of the soul is precious, and it ceaseth for ever." Let not the men of science look down with contemptuous reproof on what they deem the ignorance or apathy of the unlettered Christian. The Lord of all worlds, the Infinite Wisdom, will reverse their rash judgment, almost in the words of his affectionate reproof to Martha in days of old. Like her, human philosophy is careful and troubled "about many things,"—the tails of comets, the ring of Neptune, the parallax of Sirius, the structure of nebulæ invisible to the naked eye. But let us never forget this gracious warning, that "one thing is needful"

—the knowledge of our state as fallen sinners; the sense of his love, as an all-sufficient Saviour; the new birth of the Spirit, without which none can enter the kingdom of God: and those unlettered Christians, whom proud philosophy is apt to despise, have chosen, like Mary, that good part which shall never be taken away from them.

THE END.

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A VIEW OF

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